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Original research article

Correlation between clinical findings and magnetic resonance imaging for the assessment of local response after standard treatment in cervical cancer☆

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ABSTRACT

Background: The aim of our study is to evaluate the correlation between gynecological examination and magnetic resonance (MRI) findings for the assessment of local response in cervical cancer patients treated with radiotherapy/chemotherapy (RT/ChT).

Patients and methods: This study is a retrospective review of 75 consecutive cervical cancer patients from April 2004 to November 2009 treated with RT/ChT. Clinical and radiological data were subsequently analyzed. Patient's median age was 51 with a FIGO stage from Ib to IVb. Individualized RT/ChT was administered with a median dose of 45 Gy. Sixty-three patients received a complementary brachytherapy. Seventy-one patients received chemotherapy on a weekly basis. Gynecological exam was performed 3 months and 6 months after treatment and these findings were compared to MRI results at the same time.

Statistic analysis: We used the Spearman's Rho test to determine the correlation level between the clinical and radiological methods.

Results: A correlation of 0.68 (60%) was observed between the clinical and MRI findings at 3 months with a further increase of up to 0.86 (82.6%) at 6 months. In the few cases with a poor correlation, the subsequent assessment and the natural history of the disease showed a greater value of the clinical exam as compared with the MRI findings.

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Conclusions: Physical exam remains an essential tool to evaluate the local response to RT/ChT for cervical cancer. The optimal clinical radiological correlation found at 6 months after treatment suggests that the combination of gynecological examination and MRI are probably adequate in patient monitoring.

1. Background

Cervical cancer is a very important issue in women's health, representing the second most common malignancy with an incidence of 500,000 patients annually worldwide [1,2].

The patients with locally advanced disease are optimally treated with a combination of radio/chemotherapy (RT/ChT) [3,4]. However, there is no clear consensus for the optimal post-treatment evaluation.

The use of magnetic resonance imaging (MRI) for the evaluation of cervical cancer before and after treatment is well established but there are some important and difficult issues that must be addressed [5]. Some of them are the evaluation of tumor response to therapy and the distinction between post-radiation changes and viable tumor.

The differential between residual tumor and radiation changes cannot be done with conventional magnetic resonance images especially in the first 3 months after therapy [6]. When changes in tumor occur as a consequence of biological and molecular changes, functional imaging techniques are considered as an adjunctive tool in evaluating tumor features (Positron Emission Tomography, PET-scan).

We know that MRI may be superior to computed tomography (CT) for residual tumor detection because of its high contrast resolution. The residual disease has a high signal intensity on T2-weighted images, similar to the corresponding primary tumor [7]. Therefore, MRI is considered the method of choice for follow-up after surgery or radiation treatment recommended by the FIGO guidelines because of its usefulness in the detection of local disease recurrence. However, physician experience with radiological post-treatment changes is essential to prevent misinterpretations.

For these reasons, imaging techniques, especially magnetic resonance imaging, are widely used as a complement to the pelvic exam [8].

2. Aim

The purpose of our study is to determine the correlation degree between the clinical and radiological findings in the evaluation of treatment response to radio/chemotherapy in patients with locally advanced cervical carcinoma.

3. Patients and methods

A total of 75 consecutive patients presenting with a diagnosis of locally advanced cervical cancer treated with either radiation alone or concomitant radio/chemotherapy in our hospital between April 2004 and November 2009 were included. Median age was 51 years (range: 29–81). Histopathological diagnosis was squamous carcinoma in 59/75 patients (78.7%), adenocarcinoma in 9/75 (12%) and other carcinomas (adeno-squamous, small cell) in 7/75 patients (9.3%).

Patients were staged using the 1988 FIGO classification (Fédération Internationale de Gynécologie Obstétrique) [9]. The main clinical characteristics are summarized in Table 1.

Node staging was performed prior to radiotherapy (RT) by laparoscopic lymphadenectomy in 64 patients (85.33%): pelvic lymphadenectomy in 29 patients (38.7%) and pelvic plus paraaortic lymphadenectomy in 35 patients (46.7%).

All patients were treated with external beam radiotherapy (EBRT): pelvic only in 60 patients and both pelvic and paraaortic in 15 patients. Treatment was performed using 6 MV or 18 MV photons from a Linear Accelerator with multileaf collimator after 3D planning. The total median dose was 45 Gy, with daily fractions of 1.8–2 Gy, once a day, 5 days per week. Seventy-one patients received concomitant RT–ChT based on platin compounds and only 4/75 patients did not undergo ChT (elderly and/or low performance status).

Sixty-three patients (84%) received brachytherapy (BT) in addition to EBRT. Within this group, 54 patients received low-dose rate BT (median dose: 30 Gy at point A) and the 9 remaining patients received high-dose rate BT (median dose: 22 Gy at point A). The treatment was completed with an EBRT parametrial boost with a median dose of 14 Gy in 41 patients (54.6%).

Magnetic Resonance Imaging and Abdominal CT scan were performed in all patients before RT. The treatment response was evaluated 3 and 6 months after the completion of therapy with a complete physical examination (including vaginal vault inspection plus bimanual pelvic examination) and radiological assessment with MRI. All the MRIs were analyzed in a tumor

Table 1 – Clinical characteristics of the 75 patients.

Age	
Median	51 years
FIGO stage	
Ib2	8 (10.7%)
IIb	26 (34.6%)
IIIb	33 (44%)
IV	8 (10.7%)
Pathology	
Squamous	59 (78.7%)
Adenocarcinoma	9 (12%)
Others	7 (9.3%)
Radiotherapy (median dose)	
Pelvic	60 (80%)
Paraaortic	15 (20%)
Chemotherapy	
Yes/no	71/4